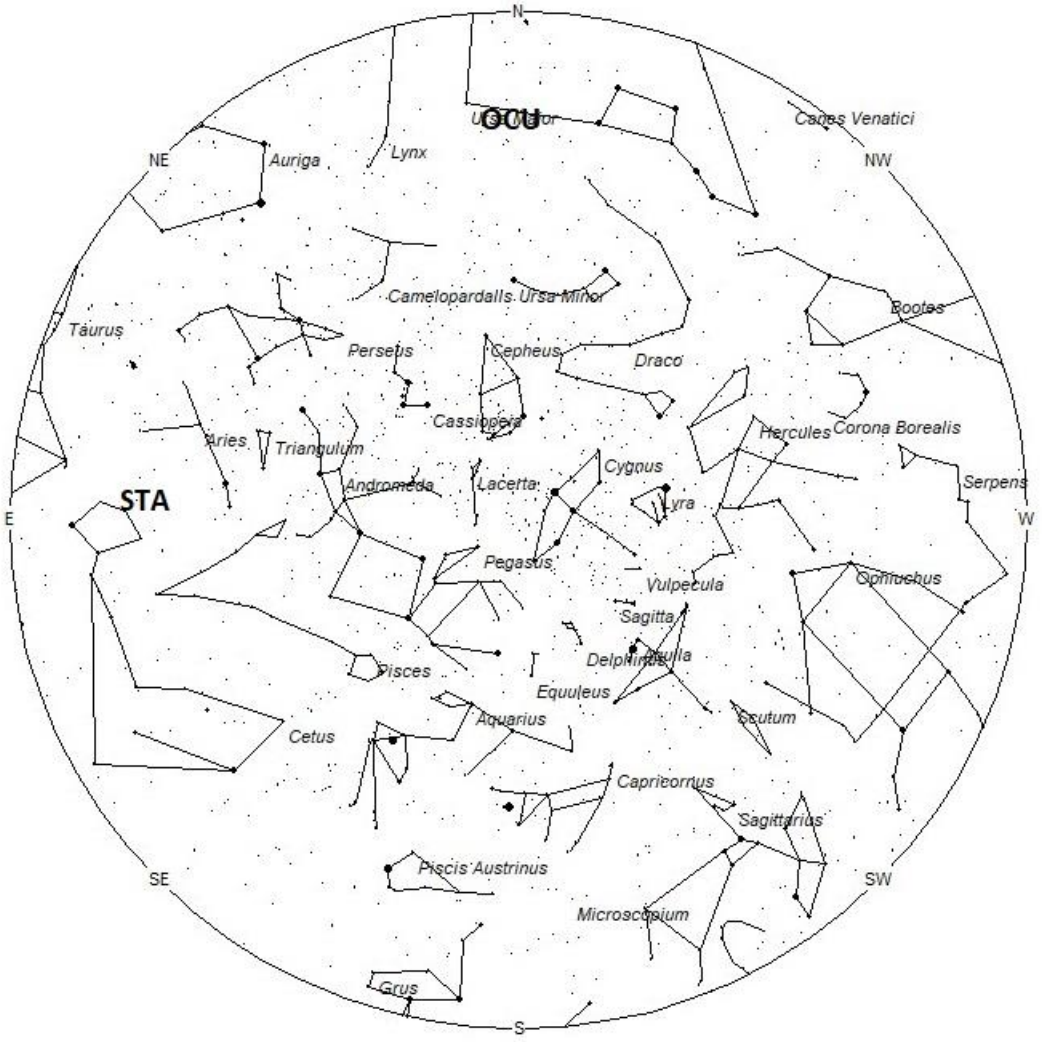
Meteor Activity Outlook for October 12-18, 2024

Cathy Warner captured this impressive fireball on May 2, 2024, at 23:34 PDT (6:34 UT) from Union, Washington USA. ©Cathy Warner

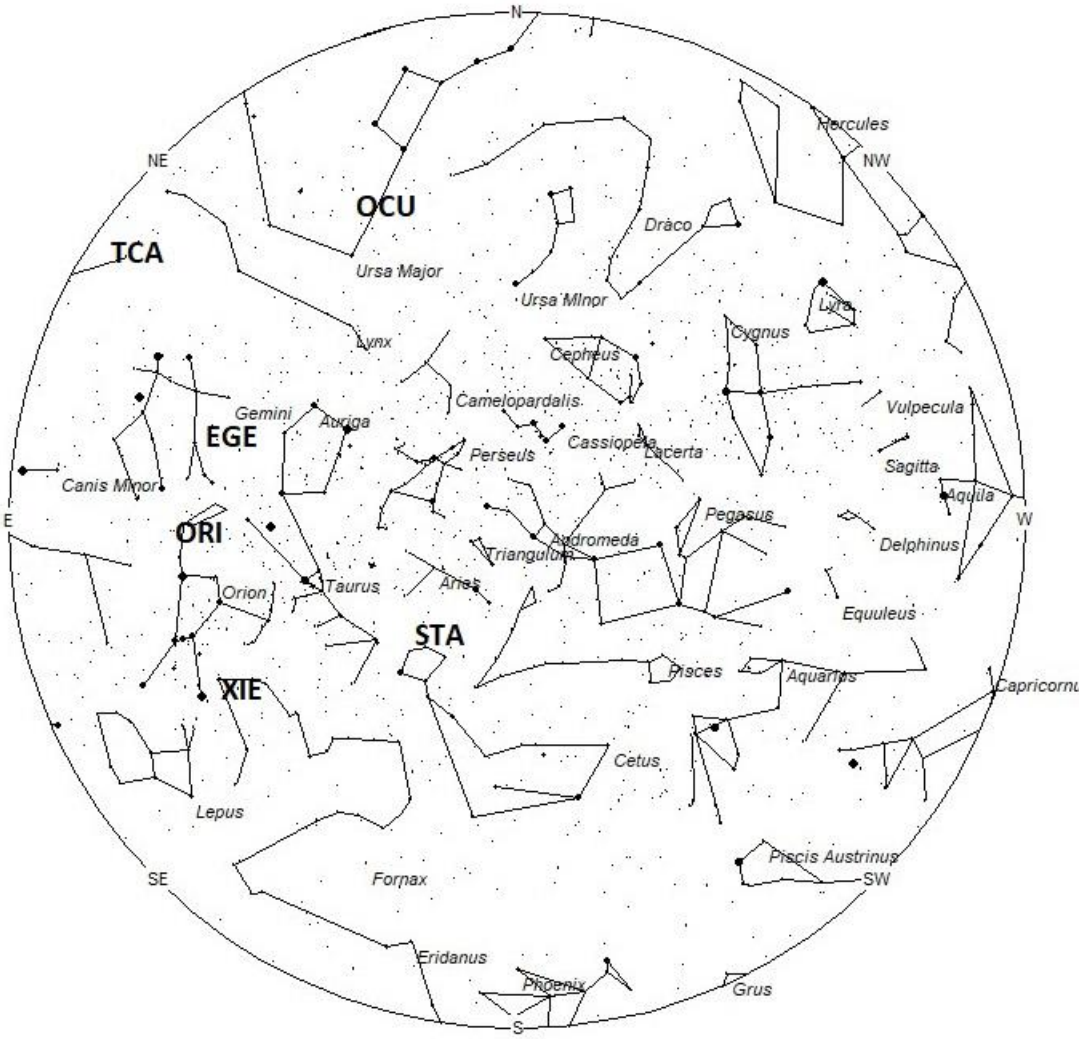
During this period, the moon reaches its full phase on Thursday October 17th. At that time the moon will lie opposite to the sun and will lie above the horizon all night long. This weekend the waxing gibbous moon will set during the early morning hours, allowing a small window of opportunity to view meteor activity under dark skies. The estimated total hourly rates for evening observers this weekend should be near 3 as seen from mid-northern latitudes (45N) and 2 as seen from tropical southern locations (25S) For morning observers, the estimated total hourly rates should be near 14 as seen from mid-northern latitudes (45N) and 11 as seen from tropical southern locations (25S). The actual rates seen will also depend on factors such as personal light and motion perception, local weather conditions, alertness, and experience in watching meteor activity. Rates are reduced during this period due to moonlight. Note that the hourly rates listed below are estimates as viewed from dark sky sites away from urban light sources. Observers viewing from urban areas will see less activity as only the brighter meteors will be visible from such locations.

The radiant (the area of the sky where meteors appear to shoot from) positions and rates listed below are exact for Saturday night/Sunday morning October 12/13. These positions do not change greatly day to day so the listed coordinates may be used during this entire period. Most star atlases (available at science stores and planetariums) will provide maps with grid lines of the celestial coordinates so that you may find out exactly where these positions are located in the sky. I have also included charts of the sky that display the radiant positions for evening, midnight, and morning. The center of each chart is the sky directly overhead at the appropriate hour. These charts are oriented for facing south but can be used for any direction by rotating the charts to the desired direction. A planisphere or computer planetarium program is also useful in showing the sky at any time of night

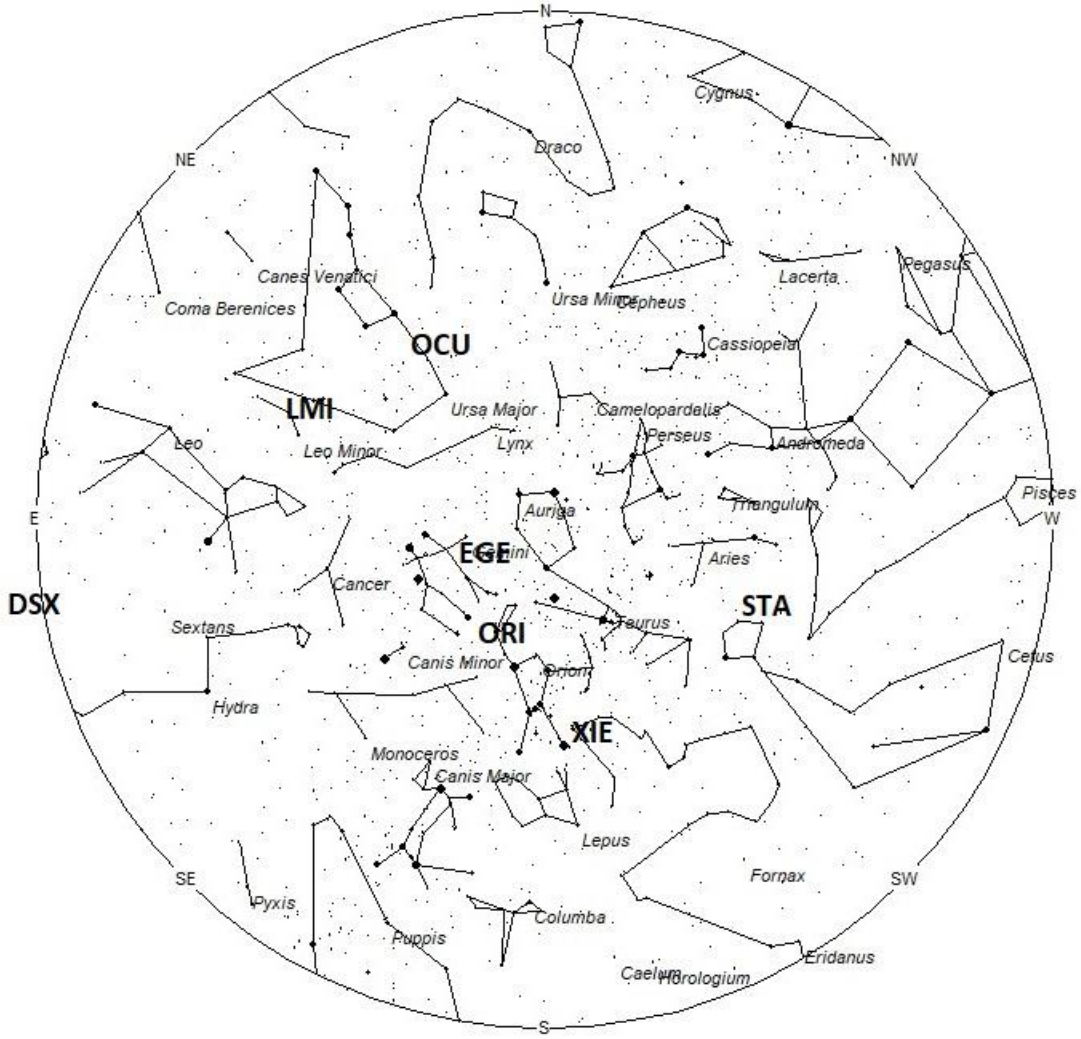
on any date of the year. Activity from each radiant is best seen when it is positioned highest in the sky, either due north or south along the meridian, depending on your latitude. Radiants that rise after midnight will not reach their highest point in the sky until daylight. For these radiants, it is best to view them during the last few hours before dawn. It must be remembered that meteor activity is rarely seen at its radiant position. Rather they shoot outwards from the radiant, so it is best to center your field of view so that the radiant lies toward the edge and not the center. Viewing there will allow you to easily trace the path of each meteor back to the radiant (if it is a shower member) or in another direction if it is sporadic. Meteor activity is not seen from radiants that are located far below the horizon. The positions below are listed in a west to east manner in order of right ascension (celestial longitude). The positions listed first are located further west therefore are accessible earlier in the night while those listed further down the list rise later in the night.



Radiant Positions at 9pm Local Daylight-Saving Time



Radiant Positions at 1am Local Daylight-Saving Time



Radiant Positions at 5am Local Daylight-Saving Time

These sources of meteoric activity are expected to be active this week

We are now encountering inbound debris from comet 2P/Encke, which has its source superimposed upon the anthelion radiant. Since it has been shown that meteors from 2P/Encke are more numerous than the Anthelions, we will recognize this activity as the **Southern Taurids (STA)** from now until late November, when we no longer encounter remnants from comet 2P/Encke. Like the anthelion radiant, the source area is large and diffuse so observers can be liberal with the shower association of these meteors. Recent investigations of the Southern Taurids have revealed two clearly distinct components. The first component, also known as the October Arietids, represents the early and annual activity of Southern Taurids. It displays very little variation year to year. The latter component represents the main source of activity and is periodic. The early STA's are active from September 28 through November 2 and peaks on October 14th. The main component of the STA's are active from October 12 through November 27 and peaks on November 5th. The center of the large STA radiant is currently located at 02:22 (035) +10. This position lies in southwestern Aries, 1 degree west of the faint star known as xi Arietis. This radiant is best placed near 0200 local daylight-saving time (LDST), when it lies on the meridian and is located highest in the southern sky. Rates at this time should be near 2 per hour no matter your location. With an entry velocity of 29 km/sec., the average STA meteor would be of medium-slow velocity.

The **xi Eridanids (XIE)** are a recent discovery by Dr. Peter Jenniskens using his video network called CAMS. These meteors are active from October 5-16, peaking on the 11th. On that night, the radiant is located at 04:36 (069) -06. This position lies in northeastern Eridanus, 3 degrees west of the 4th magnitude star known as omega Eridani. To best see these meteors, face toward the south near 04:00 LDST. Rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 54 km/sec., the average XIE meteor would be of medium-fast velocity.

The **Orionids (ORI)** are active from October 2 through November 12, with maximum activity occurring on October 22nd. The radiant is currently located at 05:57 (089) +15, which places it in northeastern Orion, 2 degrees west of the 4th magnitude star known as nu Orionis. This area of the sky is best placed for observing during the last dark hour prior to dawn, when it lies highest in the southern sky. Current rates are expected to be near 2 per hour, no matter your location. With an entry velocity of 67 km/sec., the average ORI meteor would be of swift velocity.

The **epsilon Geminids (EGE)** are active from September 27th through November 7th with maximum activity occurring on October 16th. The radiant is currently located at 06:26 (097) +29. This area of the sky lies in southeastern Auriga, 2 degrees east of the 4th magnitude star known as kappa Aurigae. To best see these meteors, face toward the east during the last dark hour prior to dawn. Rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 69 km/sec., the average EGE meteor would be of swift velocity.

The **tau Cancrids (TCA)** are a weak shower with a long activity period of seven weeks. They are active from September 27 through November 12 with maximum activity occurring on October 22nd. The radiant currently lies at 08:44 (131) +30, which places it in northern Cancer, 1 degree north of the 4th magnitude star known as iota Cancri. To best see these meteors face eastward during the last few hours of the morning prior to dawn. Expected hourly rates are less than 1 per

hour no matter your location. With an entry velocity of 67 km/sec., the average TCA meteor would be of swift velocity.

The **October Ursa Majorids (OCU)** are a recent discovery by Uehara and his colleagues in Japan (Uehara et al., 2006), These meteors are only active from October 14-16 with maximum activity occurring on October 15th. The radiant is located at 09:43 (146) +64. This position lies in northwestern Ursa Major, 1 degree northeast of the faint star known as 23 Ursae Majoris. See the charts for a better idea of the location of this source. This area of the sky is best placed during the last hour before dawn, when it lies highest above the northeast horizon. Current rates would be most likely less than 1 per hour no matter your location. But near maximum, rates may reach 2 per hour during the late morning hours as seen from the northern hemisphere. Due to its extreme northern position, these meteors are not visible from the southern hemisphere. With an entry velocity of 56km/sec., most activity from this radiant would be of swift speed.

The **Leonis Minorids (LMI)** are active from October 15th to November 7th, with maximum activity occurring on October 22nd. The radiant is currently located at 09:58 (150) +40, which places it in northern Leo Minor, 1 degree south of the faint star known as 19 Leonis Minoris. These meteors are best seen by facing toward the east during the last couple of hours prior to dawn. This shower is better for observers situated in the northern hemisphere where the radiant rises far higher into the northeastern sky before the start of morning twilight. Current rates should be less than 1 per hour no matter your location. At 62km/sec., the average Leonis Minorid is swift. From my personal experience this minor shower produces a high proportion of bright meteors.

The **Daytime Sextantids (DSX)** are active from September 22-October 13, with maximum activity occurring on October 1st. The current position of the radiant is 11:06 (167) -07. This position lies in on the Crater/Leo border, 3 degrees southwest of the 4th magnitude star known as phi Leonis. Rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 31 km/sec., the average DSX meteor would be of medium-slow velocity. No matter your location, these meteors are difficult to observe as the radiant lies roughly 30 degrees from the sun. Therefore, these meteors may only be seen during the last hour prior to dawn, shooting upward from the eastern horizon.

Sporadic meteors are those meteors that cannot be associated with any known meteor shower. All meteor showers are evolving and disperse over time to the point where they are no longer recognizable. Away from the peaks of the major annual showers, these sporadic meteors make up the bulk of the activity seen each night. As seen from the mid-northern hemisphere (45N) one would expect to see during this period approximately 10 sporadic meteors per hour during the last hour before dawn as seen from rural observing sites. Evening rates would be near 2 per hour. As seen from the tropical southern latitudes (25S), morning rates would be near 7 per hour as seen from rural observing sites and 1 per hour during the evening hours. Locations between these two extremes would see activity between these listed figures.

The list below offers the information in tabular form of the showers that I feel are within reach of the visual observer to discern. Hourly rates are often less than one, so these sources are rarely listed as visual targets in most meteor shower lists. If you are like me and wish to associate as many meteors as possible with known sources, then you will appreciate these listings. Before listing

meteors from these obscure sources, you should attempt to prove these meteors belong to them and are not chance alignments of sporadic meteors. You can note parameters such as duration, length, radiant distance and the elevation of each meteor to help compute the probability of shower association. It should be remembered that slow meteors can be seen from fast showers, but fast meteors cannot be produced from slow showers. Slower showers are those with velocities less than 35/km per second. Slow meteors can appear from fast showers when they appear close to the radiant or low in the sky. The table located on page 22 of the IMO's 2024 Meteor Shower Calendar is a big help in aiding in the identification of meteors. If you record the length and duration of each meteor, you can use this chart to check the probability of the meteor belonging to a shower of known velocity. If the angular velocity is similar to the figure in the table, then your meteor probably belongs to that shower. Rates and positions are exact for Saturday night/Sunday morning.

SHOWER	DATE OF MAXIMUM ACTIVITY	CELESTIAL POSITION	ENTRY VELOCITY	CULMINATION	HOURLY RATE	CLASS
		RA (RA in Deg.) DEC	Km/Sec	Local Daylight-Saving Time	North-South	
Southern Taurids (STA)	Oct 14	02:22 (035) +10	29	02:00	2 - 2	II
xi Eridanids (XIE)	Oct 11	04:36 (069) -06	54	05:00	<1 - <1	IV
Orionids (ORI)	Oct 22	05:57 (089) +15	67	06:00	2 - 2	I
epsilon Geminids (SPE)	Oct 16	06:26 (097) +29	69	06:00	<1 - <1	II
tau Cancrids (TCA)	Oct 22	08:44 (131) +30	67	08:00	<1 - <1	IV
October Ursa Majorids OCU)	Oct 15	09:43 (146) +64	56	09:00	<1 - <1	IV
Leonis Minorids (LMI)	Oct 22	09:58 (150) +40	62	09:00	<1 - <1	II
Daytime Sextantids (DSX)	Oct 01	11:06 (167) -07	31	11:00	<1 - <1	IV

You can keep track of the activity of these meteor showers as well as those beyond the limits of visual observing by visiting the NASA Meteor Shower Portal. You can move the sky globe to see different areas of the sky. Colored dots indicate shower meteors while white dots indicate sporadic (random) activity. The large orange disk indicates the position of the sun so little activity will be seen in that area of the sky.

Class Explanation: A scale to group meteor showers by their intensity:

- **Class I**: the strongest annual showers with Zenith Hourly Rates normally ten or better.
- **Class II**: reliable minor showers with ZHR's normally two to ten.
- **Class III**: showers that do not provide annual activity. These showers are rarely active yet have the potential to produce a major display on occasion.
- **Class IV**: weak minor showers with ZHR's rarely exceeding two. The study of these showers is best left to experienced observers who use plotting and angular velocity estimates to determine shower association. These weak showers are also good targets for video and photographic work. Observers with less experience are urged to limit their shower associations to showers with a rating of I to III.